APRIL/MAY 2023

CEL31 — PHYSICS OF MATERIALS

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is ionic bond?

2. Define unit cell.

3. What are Miller indices?

4. State Bragg's law.

5. Define Fermi energy.

6. State Ohm's law.

7. What are called semiconductors?

8. State law of mass action.

9. What do you mean by depletion region?

10. Define Hall coefficient.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Explain the types of bonds in crystals.

Or

(b) Describe the lattice parameters.

12. (a) Derive Bragg's law.

Or

(b) Discuss the Laue's method.

13. (a) Outline the density of states.

Or

(b) Obtain an expression for Fermi energy.

14. (a) Enumerate the effect of temperature on semiconductors.

Or

(b) Write a short on Fermi level in n type and p type semiconductor.

15. (a) Brief the mobile and immobile charges.

Or

(b) Deduce an expression for potential barriers.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the seven crystal systems.

17. Describe the rotating crystal method.

18. Discuss the Drude-Lorentz theory.

19. Explain the n type and p type semiconductors.

20. Describe the experimental determination of Hall coefficient.

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